WEEDS and TURF
PEST CONTROL

MAY 1963

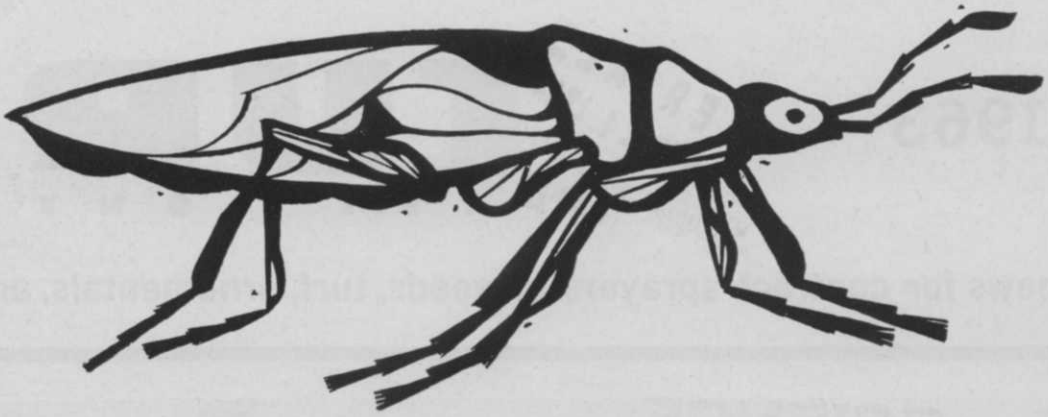
Monthly news for contract sprayers of weeds, turf, ornamentals, and trees

A Florida operator says this spray rig and accessories eliminate drift hazards.

Tritac Is New Herbicide For Industrial Use . . W-14

Riddle of the Chinch Bugs Is Partially Solved . . W-16

How a Florida Sprayman Built His Own Fleet of Trucks W-10



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TECHNICAL CHEMICALS DEPT., NIAGARA CHEMICALS DIVISION, MIDDLEPORT, NEW YORK

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with a famous

FONTAN

THE R.5 FONTAN FOR HEAVY DUTY WEIGHT 37 LBS.

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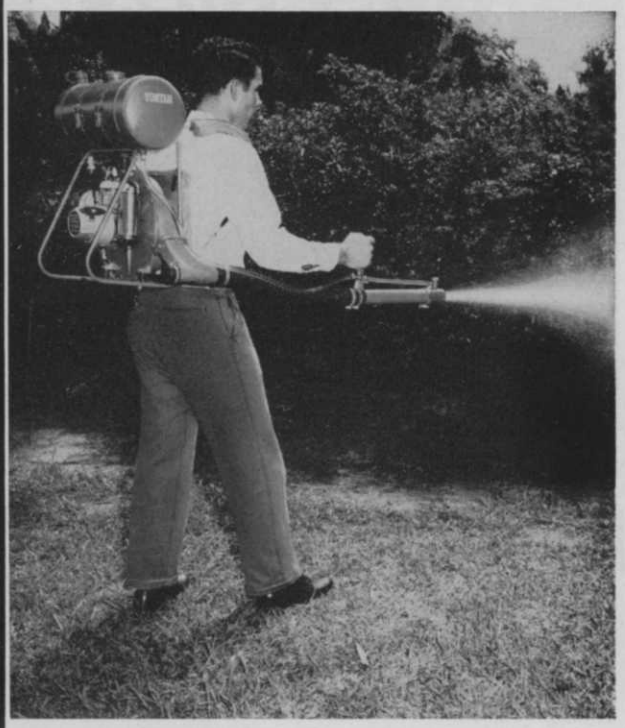

THE R.6 FONTAN FOR SMALLER JOBS WEIGHT 24 LBS.

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Here's the one unit that gives you just what you want . . . when you want it. The famous Hardie Aero-Mist Sprayer. It embodies the recommendations of State & Federal authorities; tree service organizations and foresters who sought in one unit a high-velocity ample air volume sprayer for any type job, along with low price.

With its high velocity, 150 mph, it is of special value in the treatment of trees infested with the bark beetle. Public Health officials also use the Hardie for mosquito control. With the attachment of the Hardie Duster, you have two machines in one. You can use either spray materials; dust or granular materials. Write for full details.

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WEEDS and TURF PEST CONTROL

A SECTION OF PEST CONTROL MAGAZINE

May, 1963

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What's a CA?

What is a contract applicator? The question is not a facetious one, because a cloud of confusion seems to hang over the proper name for firms which spray weeds, turf, ornamentals, or trees on a contract basis.

Some publications refer to "custom applicators," but we have avoided this term because it has come to refer primarily to agricultural operators. It is felt that some distinction should be made between these crop sprayers and their urban/industrial counterparts.

We've also heard "contract sprayer," "lawn pest controller," "horticultural sprayman," etc.

Of these three, we favor the last, but it is almost too cumbersome to use with ease.

Last month we talked about the necessity to tell the public, (and suppliers) about the thriving outdoor spraying market. This cannot be done effectively unless industrymen agree on a common term for the men who guide weed control and turf spraying companies.

Since the advent of this magazine, our staff has favored the expression "contract applicator," because it implies that work is done on a "spray-for-pay" basis, and that application of a substance is involved (the materials applied, of course, range from insecticides to herbicides, to fertilizers, etc.).

After ten issues of *Weeds and Turf*, we've noticed the expression, with its convenient abbreviation "CA," is being picked up and used by suppliers, educators, and industrymen alike. All that's necessary now, it seems, is some kind of formal recognition of the term.

Applicators, and their customers and suppliers, will all benefit from this industry standardization.

We hope this editorial will make each reader aware of the need to identify himself. Those who object to "CA" or who have other suggestions are invited to correspond with the editor.

Contents of this Issue © Trade Magazines, Inc., 1963

with NEW

AQUATHOL® PLUS

Here's a remarkable new addition to our line of aquatic weed killers. Aquathol Plus can rid ponds and lakes of 25 different weed species. When used as directed it is...

- **NOT HARMFUL TO FISH,** fowl or aquatic animal life.
- **EASY AND NON HAZARDOUS** to apply in liquid or granular form.
- **FREE OF TOXIC BUILD-UP...** leaves water usable for recreation.
- **EFFECTIVE AND FAST ACTING** for spot or complete lake treatment.

Contact your supplier or mail coupon for helpful brochure on aquatic weed identification and control.

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PENNSALT CHEMICALS CORPORATION

Department PC

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3239 Mayfair Blvd., Fresno, Calif.
P. O. Box 1206, Montgomey, Ala.
2901 Taylor Way, Tacoma, Wash.

Please send me your Aquathol folder. I'm interested in treating:

☐ Pond ☐ Lake ☐ Dock or Beach Area

Approximate size of area to be treated

.....

Name.....

Address.....

City..... Zone..... State.....

—W & T Mailbox—

Extensive Coverage Startling

Coverage of the 17th Annual Northeastern Weed Control Conference by *Weeds and Turf* (*W&T*, Jan. '63, p. W-22) was quite startling in its length and detail. The executive committee of the NWCC was completely overwhelmed and appreciative of *W&T*'s efforts on our behalf.

I feel quite sure that a fair number of people attended our conference this year as a result of having read about it in *Weeds and Turf*. And, of course, one of the largest sections was the one dealing with industrial weed and brush control.

Dr. John A. Meade

Secretary-Treasurer
Northeastern Weed Control Conference
University of Maryland
College Park, Md.

W&T Proves Useful

As the off-campus educational arm of the U.S. Department of Agriculture and the College of Agriculture, Ohio State University, one of our responsibilities is with the professional grounds maintenance workers. We conduct 3 to 4 programs throughout the year dealing with management of turf and ornamental plants. The big part of this program is weed control.

Already we have used the information in *Weeds and Turf* on MH-30 (*W&T*, Sept. '62, p. W-1) to help a large utility company with a problem on grass control.

Fred K. Buscher

Area Extension Work
U.S. Dept. of Agriculture
Cleveland, Ohio

Who Supplies Tricalcium Arsenate?

I have enjoyed reading your *Weeds and Turf* section very much. Perhaps you would know of a supplier of tricalcium arsenate whom I could contact. If so, would you send me the name and address?

It seems that public interest in maintaining lawns is increasing, and that we are receiving more calls for this type of work. Unfortunately, many of us have little experience in controlling crabgrass and broadleaved weeds in lawns. Any information you might send would be appreciated.

Richard L. Parker

Craig Pest Control Co.
Ponca City, Okla.

We do not make a practice of recommending individual distributors, but we would like to refer you to page W-10 of the October issue of Weeds and Turf, *which contains a suppliers' guide. On this page, you will note that a number of suppliers of tricalcium arsenate are listed. Each supplier will probably be able to give the information you desire.* Ed.

Green Dyes Available?

We are interested in obtaining information regarding the types of green dyes available for coloring lawns during the dormant season.

Most lawns in this vicinity are composed of Bermuda, and turn a light brown color in the fall, winter, and early spring. We feel a service of this sort would greatly benefit our organization, and offer another means of lucrative service.

R. E. Powell

G. Edward Chase Co., Inc.
San Diego, Calif.

Perhaps suppliers of green dye for lawns will communicate directly with Mr. Powell. Ed.

W&T Gives Fine Presentation

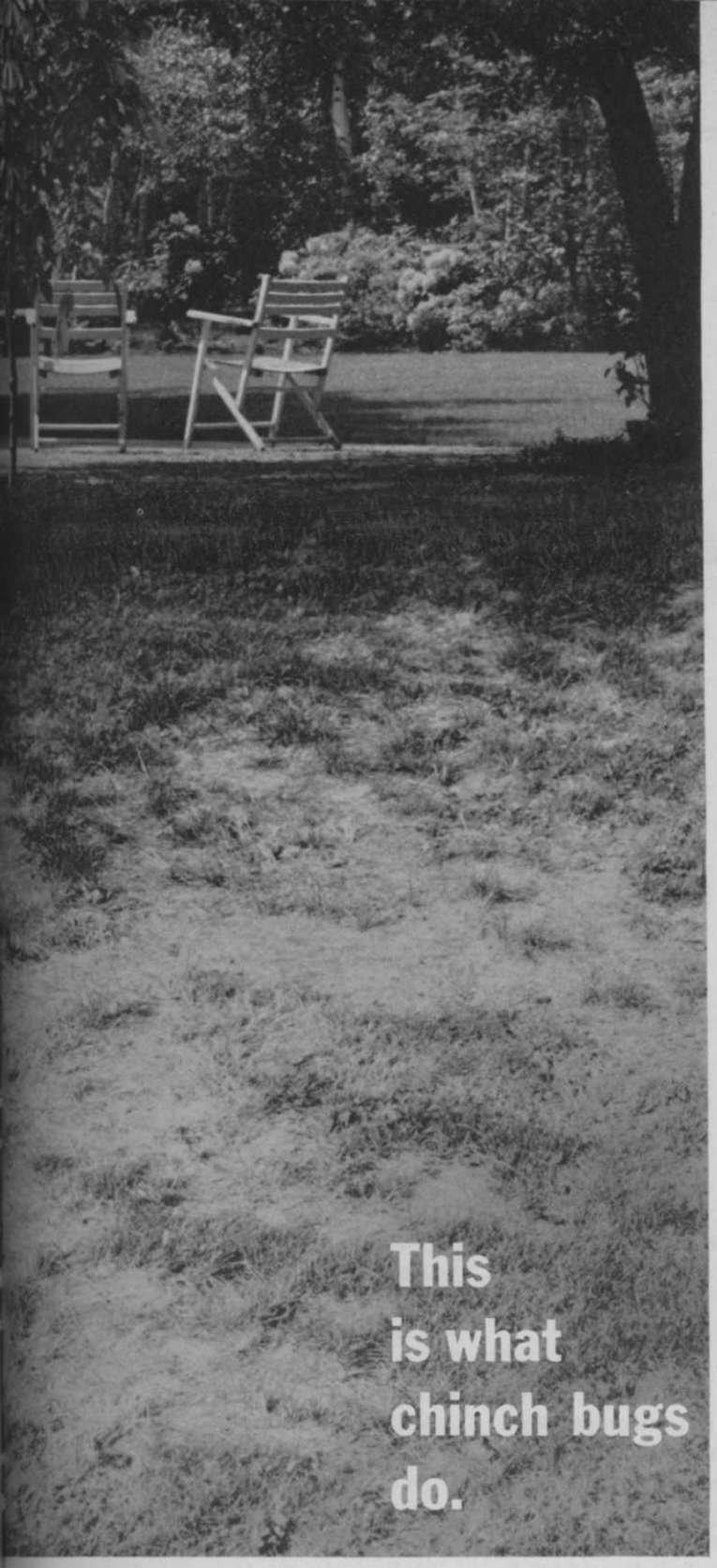
I would like to congratulate *Weeds and Turf* on the fine presentation on the urban/industrial weed control business. This is something that has long been needed by contract applicators.

As an older member of this industry, having started in Ontario in 1945, I frequently wished for information which I have since found in your magazine.

D. Parker-Sproule

Thumb Weed Spraying Service
Harbor Beach, Mich.

Weeds and Turf welcomes expressions of opinions from its readers. Send ideas and comments briefly as possible to Charles D. Webb, Editor, Weeds and Turf, 1900 Euclid Ave. Cleveland 15, Ohio.



Customer satisfaction—permanent patronage—requires sure, consistent results: the kind you can guarantee when you use TRITHION insecticide for lawn chinch bug control.

Chinch bugs are small sucking insects that feed on the juice in leaves and stems of grass, causing brown patches and eventual death of infested lawns. Chinch bug destruction is a growing problem around the country . . . but one you can solve with TRITHION.

Since 1960, thousands of lawns have been treated with TRITHION. Results have been outstanding!

TRITHION *gives quick, positive control.* It's a fast-acting compound that controls *all* chinch bugs, even those resistant to other materials.

TRITHION *is easy to handle safely.* It is less hazardous to handle than many other organic phosphate pesticides. TRITHION is an easy-to-apply emulsifiable liquid . . . and also is available in granular form.

TRITHION *offers one-shot control . . . that lasts.* Repeat applications are rarely needed with TRITHION—"one-shot control" *stops* chinch bugs. Its long residual action means long-term protection . . . with resulting reduced costs.

Use TRITHION on *your* customers' lawns. You'll boost and *maintain* the demand for *your* service. For details, write Stauffer Chemical Company, Agricultural Chemicals Division, 380 Madison Ave., New York 17, N. Y. ®Stauffer's Reg. T.M. for an insecticide-acaricide

Stauffer
CHEMICALS

BOXED IN?

TRYING to sell your weed and turf chemicals or equipment without adequate promotion?

Feel boxed in by competition? Confused by market diversity? Disgruntled with your market coverage?

If you manufacture products for the multibillion dollar weed control and turf and ornamental spraying market, you can reach every segment of the industry through the advertising pages of *Weeds and Turf*.

Contract sprayers.

Highway officials.

Railway and utility weed control men.

State and local officers.

All these men have something in common: they're interested in weed control or care of turf and ornamentals.

They have something else in common: they influence purchasing decisions.

Or do the buying themselves.

You should tell them your story. *Weeds and Turf* is the place to tell it.

Weeds and Turf has unparalleled reader acceptance. Readers say, "we **use** the magazine."

Why? We speak their language. We're growing up with the industry. We anticipate problems and help the reader solve them.

In short, we try to help the contract sprayer make more money.

He spends it on more chemicals and equipment.

Want him to spend it on yours?

Write us for the facts, including ad rates, market bulletins, other material.

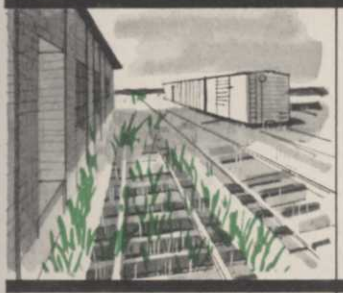
WEEDS and TURF
PEST CONTROL

TRADE MAGAZINES, INC. DEPARTMENT C-5 1900 EUCLID AVENUE CLEVELAND 15, OHIO

WEEDS!

a menace to everyone / profits for you

There's money in weeds, if you're on the right side of them. And that's with any of the many Du Pont weed and brush killers. They make custom weed control jobs easy and effective. Check the typical problems below; chances are you'll see at least half of them within a mile of where you're standing. ■ The answers are easy, too, because Du Pont has a product to meet almost any weed control situation you'll encounter.

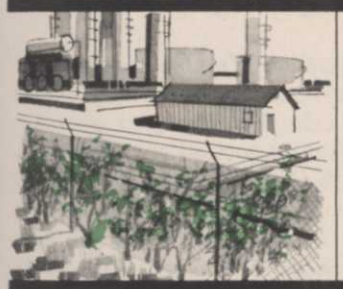


THE PROBLEM:
Hard-to-kill perennials —Johnson grass, Bermuda grass, nut-grass and quackgrass.

THE ANSWER:
Efficient, long-term control of grasses and weeds with HYVAR® isocil weed killer, an entirely new organic herbicide.

THE PROBLEM:
Rampant weed growth in storage areas causing fire hazards as well as wood and metal deterioration.

THE ANSWER:
A single application of KARMEX® diuron or TELVAR® monuron weed killers provides effective, low-cost control of weeds and grasses for a whole season.



THE PROBLEM:
Deep-rooted perennial weeds—morning glory, leafy spurge, Canada thistle and others.

THE ANSWER:
Easier control of noxious weeds than ever before with TRYSBEN® 200 weed killer. Also controls some woody plants.

THE PROBLEM:
Undesirable growth of brush on plant sites, roadsides, drainage ditches, rights-of-ways.

THE ANSWER:
Economical control of brush with safe, non-volatile, AMMATE® X or with DYBAR® fenuron weed and brush killer.

Only a few examples of the type of situations that mean opportunity for you are shown above. Product descriptions are necessarily brief, too—each of these Du Pont herbicides effectively control many other kinds of weeds or brush. For complete information mail the coupon to Du Pont today.

On all chemicals follow label instructions and warnings carefully.

DU PONT WEED & BRUSH KILLERS

Better Things for Better Living . . . *through Chemistry*

Du Pont—I. and B. Dept., PC-53
Room N-2539, Wilmington 98, Delaware

Please send me more information on Du Pont weed and brush killers.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

A built-in plus value of this gleaming spray rig is the lack of any spray drift (as shown above), author Nipp contends.

How We Built a Whole Fleet of Lawn Spray Trucks

By LARRY NIPP
American Power Spraying
Ft. Lauderdale, Florida

WE STARTED in the lawn spraying business here in the Fort Lauderdale area with a 200-gallon spray tank and an 18-GPM pump.

As our business grew, we found we were spending too much time filling the tank, and we were working the pump steadily at full capacity 8 to 10 hours per day.

At this point, we decided to get a bigger tank and pump.

All that was available for quick delivery then was a 300-gallon tank and a 20-GPM pump, so we bought them, knowing full well they were only a little better than what we were using, and far from what we really wanted. Six trucks later we realized that if we were ever to have exactly what we wanted we would have to design and build it ourselves.

Basically, this is what we had in mind: a truck that would spray all day, requiring only 2 fillings; and a truck that would enable us to spray each and every lawn that we came to with any combination of chemicals required and without delay.

In our operation, we have to be *custom* sprayers, yet do a *volume* business.

We had heard of the injection system, but this proved to be far too costly and cumbersome — not to mention troublesome from a maintenance standpoint. Finally, we came up with the idea of a "drop tank."

In our case, a 225-gallon tank is mounted at the rear and under a 1200-gallon tank, with the lower tank to be quickly filled from the upper main one. By connecting the 2 tanks with a 2″ line and a brass quick-opening quarter-turn valve, our problem was solved. With this hookup, we can fill the lower tank in one minute and 40 seconds. In addition, we installed a four-bladed agitator in the "drop" tank. This, combined with a "by-pass" line, which goes into the "drop" tank, furnishes far more agitation than we will ever need.

In the beginning we decided we wanted a pump large enough so we would never have to work it at full capacity. We also had in mind a slow-speed pump, one that would take little gas to operate.

We finally settled on a popular-make 35-GPM pump. This pump was set to turn at only 70 RPM; and in actual tests with 200 feet of ½″ hose and a gun tip 65-70 with pump pressure setting of 650 lbs. PSI, we got a pressure of 150 lbs. PSI at the gun and an output of 9 GPM from the tip. This enables us to apply 200 gallons to a lawn in a little over 20 minutes. By way of comparison, on a previous truck we had a high-speed pump with the same pressure setting, same amount of hose, and the same gun and tip. Now, with this new setup, we could also apply approximately 9 gallons per minute.

But here is the catch. On an average day this pump required 8 gallons of gas to operate. The cups on the pump had to be replaced at least every 3 months, not to mention other, more costly, repairs such as procelains, springs, etc. Over the period of a year, maintenance cost on the pump alone on the older outfit amounted

to $268.00. Maintenance of the air-cooled motor was $84.00.

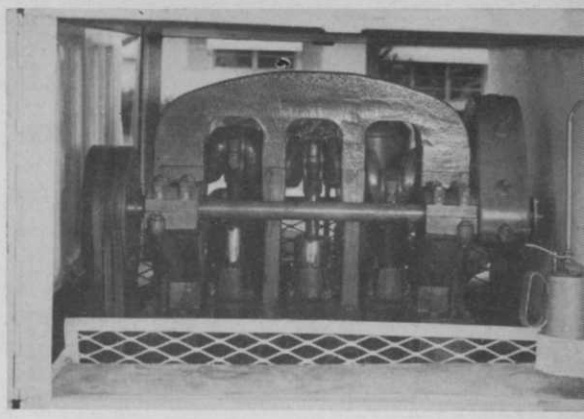
By eliminating the air-cooled motor and going to power take-off, (see W&T, July '63, p. W-8) and using a larger, slow-speed pump, our maintenance cost for the first 10 months has amounted to exactly 8 cents, which was the replacement of a cap bolt on the filter, which really has nothing to do with the pump. Bear in mind that this unit is working 6 days a week and so far as we can see is still in perfect working order.

There is one other cost factor that is most important: we find our gas consumption is approximately 4 gallons less per day doing the same amount of work. Remember, however, that this is brought about by installing a larger GPM pump in the beginning. If the pump were smaller, then the RPM would have to be faster; thus, gas consumption would naturally be higher.

We estimate our gasoline bill is reduced over $300.00 per year on each unit by the use of a larger and slower speed pump. It must also follow that a pump that is working only half of its rated capacity will last longer and require far less repair and maintenance.

There are many factors that must be considered in building a large spray truck, such as maneuverability, balance, safety, and appearance. It was easy to figure out the weight and balance factor and come up with the right size truck and the correct cab-to-axle measurement. We discovered we could not use the "cab over" type of truck, because this variety places too much of the weight on the rear axle and causes the front end to lift when loaded. Also, it is murder on rear springs, tires, universal joints, and clutch.

Care must be taken on the installation of the shafting, for the power take-off unit pillow blocks must be spaced fairly close together in order to prevent whip. Further, it is advisable to install the best that money can buy; and to avoid real trouble, these blocks must be lubricated once a week. On the average power take-off installation there will be only 7 places to grease. This operation will take a man approximately 5 minutes to do a complete lubrication. The alignment of the shaft and all shives must be perfect unless one wants to replace belts constantly. A little extra care at this point will pay off in longer belt life. Here again we use 4-B belts where, according to the experts, 3 will do. On the truck, we install 900x20 rear tires and 8.25 x20 front tires. We find these sizes give us longer tire life. Having an alternator on the truck is also a must due to the fact that the pumping is done at a speed comparable to idling speed.



Pump is mounted forward and low for easy maintenance. Fire hydrant attachment and meter are on opposite side of this same section.

Operator can add chemical to the lower tank with ease and speed, as this sprayman demonstrates.

Include Ample Baffles in Tank

Other important factors include ample baffles in the upper water tank. We divide the upper tank into 8 compartments, also utilizing the baffles to stiffen the sides, which prevents any wavy side condition. Our filling pipe is 2″, which, after entering the tank, runs up to within 2″ of the top. A 2½″ overflow pipe is then installed, which runs from below the tank up to within 2″ of the filling pipe. This supplies an "air gap" of 2″, thus preventing any syphoning action back into the fire hydrant. This syphoning action has happened; for example — a spray truck was filling at a fire hydrant when a fire truck hooked on to the same line several blocks away and actually drew from the spray tank.

Another important factor to remember is that in mounting the tank, it is a *must* to have the upper tank resting on wood. This support must be so constructed that the tank can "work." If mounted steel to steel and welded down, leaks will surely develop. In the case of some of our tanks mounted in this manner, there were splits from top to bottom.

In the beginning we worried about what coating to apply to the inside of the tank. We tried all the commercial coatings, including epoxy, and found them

Convenient storage tanks in the rear hold adequate supply of herbicides, insecticides, fertilizers, etc.

all to be unsatisfactory. In the end we found that one good coat of red lead does the job better than anything else. However, the steel must be treated first with "Metal Prep"; then once each month thereafter one quart of Toxaphene should be added to the upper tank, which keeps an oil film on the tank and prevents rusting.

The signal lights on the truck are so arranged that while the truck is pumping, the turning lights on the side and the rear can be left on and flashing.

Holds Enough Chemical for Weeks

The rear compartment can hold enough chemical to operate for several weeks if necessary. This compartment is kept locked when the operator is not present. The quick-fill valve is also located inside the locked compartment to prevent anyone from opening it and causing the "drop tank" to overflow. The "drop tank" is equipped with a locking latch so that the truck can be parked in complete safety.

We are constantly working to improve our trucks. Our next model will have a power reel, and the chemicals will be put into compartments from which they will be piped into a measuring chamber and from there into the "drop tank." Thus the operator will not handle the chemical at any time except when the chemical storage compartments are pumped full which is approximately once a week. We are certain that as time goes by we will think of many more improvements, and as we do they will be incorporated into our models. Our trucks are giving us a great savings in maintenance, and there is no waste of material since operators mix the "drop tank" for each lawn on an individual basis.

Dutch Elm Disease: Cause, Precautions

Dutch elm disease, one of several wilt diseases with similar symptoms that attack elms, has no known cure today. It is possible, however, to reduce losses by taking adequate precautions.

Usual symptoms of the disease are a wilting and yellowing or drying of foliage, usually followed immediately by defoliation and death of the affected branches. Although Dutch elm disease commonly appears on one or several branches and then spreads to other portions of the crown, the entire tree may suddenly develop disease symptoms.

A brown discoloration in the water-conduction vessels of the wood develops in all infected trees. In early spring this may be seen as brown streaks in the wood layer just under the bark of diseased branches.

Principal carriers of the Dutch elm disease fungus are two elm bark beetles: the smaller European elm bark beetle, by far the most important of the two, and the native elm bark beetle.

Habits of European Bark Beetle

European bark beetle, chief carrier of the fungus, will attack all species of elm, and plants of some closely related genera. Feeding attacks by adults are made only in living elm trees, usually in one- or two-year old twig crotches. Although adults do most feeding near their birthplace, they have been found feeding more than two miles from breeding areas.

Bark beetle feeding during the spring and early summer is most likely to result in a severe case of Dutch elm disease. Late season feeding, however, usually results in very localized infections that seldom cause serious damage to the tree.

Beetles Prefer Dying Trees

Dead or dying elm material is preferred for broods of young, although it is not uncommon for beetles to make so many attempts to breed in certain weakened but living trees that the trees eventually die and broods of the insect are successfully established.

If the fungus is established in dead or dying trees or in cut wood used by the bark beetles for breeding places, the entire generation may contact spores of the fungus on their bodies and then introduce Dutch elm disease into living trees.

Once the disease does appear in an area where the bark beetles are well established, it increases at an extremely rapid rate unless steps are taken to control it.

No cure for the Dutch elm disease is available yet. Two precautions that should be taken to curb possible loses are:

(1) Eliminate material the beetles use for breeding. Remove living elms severely weakened by drought, dead or dying elm trees, and any broken limbs or any recently cut wood. This material should be burned or the bark surfaces thoroughly wet with an insecticidal spray.

(2) Spray all living elm trees in the spring and early summer with a large gallonage of DDT or methoxychlor to prevent or reduce feeding by beetles in living elm trees.

Sanitation a Must For Plant Disease Control, Agman Notes

Contract applicators cannot keep the spread of plant diseases to a minimum unless sanitation becomes a regular practice, Dr. R. E. Partyka, plant pathologist at Ohio State University Extension Service, Wooster, points out.

Dr. Partyka recommends disinfecting tools immediately after they are used. One suggested method is to soak them for a few minutes in a crock containing 1 gallon of commercial formaldehyde in 18 gallons of water. "Methyl bromide can be used in a small, confined space," Dr. Partyka notes.

Clothing, and especially shoes, may carry an infestation from one lawn to another, he cautions CAs, and it is best to change, or take some other precaution, before moving on to another operation.

Equipment, such as sprayers, should be washed in 70% alcohol or chemically treated, whenever they are used, Dr. Partyka concludes.

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Tritac: New Weapon for Weed Control

By L. S. WHITCOMB
Market Research Manager
United States Borax & Chemical Corporation,
Los Angeles, California

DEEP-ROOTED perennial weeds, which have in the past been resistant to low-cost control measures, face another potent weapon as the result of the development of a unique new chemical.

Called Tritac, the new herbicide is a synthesized organic material, a product of research and another example of science's ability to fashion effective new tools from molecular building blocks. Originally synthesized in the laboratories of Hooker Chemical Corporation of Niagara Falls, N.Y., the product was later proved effective in extensive field tests conducted by Hooker and United States Borax & Chemical Corporation of Los Angeles, Calif.

Chemically known as 2,3,6-trichlorobenzyloxypropanol, the chemical weedkiller finds its most economical and practical application in the control of perennial weeds considered noxious by agriculture. Although it is designed for spray application, the primary herbicidal effect is through the root systems. Conditions enhancing movement into the soil, such as rainfall and porous soil, substantially increase the speed of weed kill. Volatility studies conducted according to the procedure described in the *Journal of the Association of Official Agricultural Chemists*, Vol. 43, No. 2, 1960, shows Tritac to be nonvolatile.

Tests Show Economical Control Of Herbacious Perennials

In field tests completed over a two-year period by Hooker and U.S. Borax, Tritac was applied in various concentrations on plots established in 15 states. Testing was carried out according to major market-potential areas. Results of the tests indicated that the new product will provide the most economical method yet developed for the chemical control of such deep-rooted herbacious perennial weeds as bindweed, Canada thistle, Russian knapweed, leafy spurge, bur ragweed, and toadflax.

Commercial formulation of Tritac is a 2-pounds-per-gallon emulsifiable concentrate. The organic solvent used in the formulation makes possible the inclusion of other organic herbicides where additional weedkilling effects are desired. Tritac-D, a formulation containing 2 pounds per gallon active 2,3,6-trichlorobenzyloxypropanol and 0.2 pound 2,4-D acid per gallon will be marketed jointly by Hooker and U.S. Borax. This formulation is designed to provide foliar activity on woody plants and to prevent seeding or plant maturity when applications are made during periods of drouth and/or in areas of low rainfall.

Both Tritac-D and Tritac are designed for application in water as a coarse spray with ground equipment using low or moderate pressure. If the spray is mixed thoroughly after dilution, equipment without agitation may be used for application. A minimum of 50 gallons spray solution per acre should be used where ground cover is light. A minimum of 100 gallons spray solution is recommended where ground cover is heavy. Spray volume should be sufficient to provide uniform coverage of soil and foliage.

Effective applications of Tritac and Tritac-D may be made any time when the extent of weed infestation can be determined and when the ground is not frozen, preferably when seasonal rainfall can be expected to carry the chemical into the root zone of the soil. Fall applications are recommended. Spring applications should be made after full emergence of the weeds but before development of dense ground cover.

For control of certain deep-rooted perennial weeds such as field bindweed, Canada thistle, Russian knapweed, leafy spurge, and bur ragweed, the chemical should be applied in amounts of 4 to 8 gallons (8 to 16 pounds) per acre. For small areas, 1 to 2 pints can be mixed with 4 to 5 gallons of water to cover 1,200 square feet. To assure control of such perennials with extensive root systems, the treated area should extend 10 to 15 feet beyond the limits of visible weed growth.

At the recommended rates of application, a wide range of annual and perennial broadleaf weeds, such as ragweed, lettuce, plantain, dandelion, chicory, and bouncing bet may be controlled for a season or longer. Applications are not recommended for control of perennial grasses.

The new chemical is not selective in action and may be toxic to all types of vegetation; it may render the entire treated area totally or partially unproductive for one or more years. Care should be taken to confine the use or application to the particular area intended to be treated and to avoid its contact with lawns, trees, shrubs, crops, and other desirable plants which are not intended to be destroyed or injured. This includes precautions in treating areas which may be underlaid by roots of adjacent valuable growths. Careless application of this material, or washing by water runoff, to areas where desirable plants are growing or which will be used for later planting may result in injury to such plants. Water used to flush equipment should not be drained on or near these sensitive areas.

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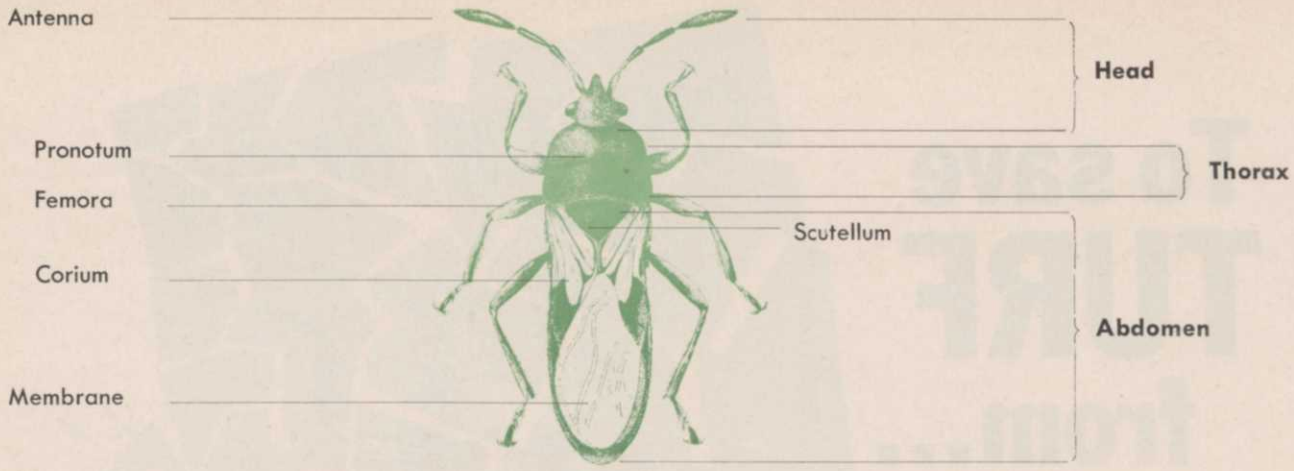

Drawing of typical chinch bug, *Blissus leucopterus* (Say); this is long-winged form.

How to Identify and Control Chinch Bugs

Results of another *Weeds and Turf* field research project

THERE is some confusion in entomological circles which directly affects the turf pest control business. The mention of "chinch bug" by a worker in one part of the country can be interpreted by two other people, in other areas, as different insects. This part of the problem is practical, the other part is academic. It seems that there is confusion whether *hirtus* and *insularis* listed below as subspecies should be subspecies or should be listed directly under *leucopterus* as a separate and distinct species.

To begin a short study of chinch bugs, it is necessary to know something about the order and family to which chinch bugs belong.

Order Hemiptera is that insect group which comprises the true bugs. "Hemiptera" refers to the front wing structure of this order. The basal portion of the wing is thickened and somewhat leathery; it is called the corium. The apical or distal portion is typically membranous as is the second set or hind wings. With only half of the front set membranous, we get the term descriptive of the order, hemiptera or "half wing." At rest insects in this order fold their wings across their backs so that an "X" pattern is suggested.

Hemiptera also have piercing, sucking mouthparts made up of fused maxillae and mandibles (2 each). There are no accessory mouthparts as are found in the mosquito. At rest the stylet is held between the legs almost parallel to the body.

Another character which helps to distinguish Hemiptera is the scutellum. This is a triangular structure directly on the back of the insect which might be described as "right between his shoulder blades." Although Hemiptera share this character with another insect group, when one finds an insect with a scutellum and divided wings, he can be certain it's a Hemipteran.

The family which concerns us here is Lygaeidae (lie-gee'-ih-dee), sometimes called the chinch bug family, not because the chinch bug is typical but because it is the most destructive member of the family. Lygaeids are generally phytophagus or plant sap suckers. They insert their beaks into tender portions of plants, usually of the grass family, and feed on juices from the insides.

Blissus is the genus of this family in which we are interested. The following characters will help identify a member of the genus *Blissus*. The slightly cone-shaped head is bent gradually downward anteriorly. The antennae are as long as the head and the pronotum combined. The pronotum covering the thorax is convex in the middle, tapering downward at the sides. The scutellum previously described does not have a ridge down the middle of it as other members of this family may have. When the adult insect is at rest, all that can be seen is a small part of the sides of the abdomen below the wings; the wings do not completely cover the abdomen but leave a slight margin showing.

Blissus leucopterus (Say) is the chinch bug of agricultural infamy. Thomas Say, a nineteenth century taxonomist, originally described this species in a genus other than *Blissus*; that is why his name appears in parentheses after the species name.

Since *Blissus leucopterus* is the representative type for chinch

Figure 1. Here is the classification of the chinch bug, showing the "subspecies" which have perplexed some researchers.

Class: Insecta

Order: Hemiptera

Family: Lygaeidae

Genus: *Blissus*

Species: *leucopterus*

Subspecies:

-hirtus?

-insularis?

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bugs, let us examine the life cycle of this agricultural pest and see how it applies to residential pest control.

Life Cycle

Adults come out of hibernation in the spring when temperatures rise into the 70's. They may have spent the winter in any number of places: in clumps of perennial grasses, under leaves and litter near small woods, under hedges, in shocks of corn, under bark of trees or in cracks of fenceposts, or under boards or shingles of homes or outbuildings. These hibernating places will generally have a southwest exposure to gain benefit from the sparse winter sun. Usually large groups of adult chinch bugs will be found hibernating in one place.

Mating is thought to take place before the bugs take flight from the hibernation spot. After mating, the few adults which have survived the winter fly to the nearest field of wheat or small grain where the adult females lay several hundred eggs over a period of about 20 days.

Eggs hatch, depending on temperature, in 1 to 2 weeks or perhaps longer. The young nymphs, as they are called, are bright red and about half the size of a pinhead. They insert their mouthparts into plants where they were hatched and begin sucking the plant juices. Many feed on the same plant and this is what causes the yellow spots on grass. As the insects move outward from the area which they have killed, a circular pattern of damage is seen.

Metamorphosis is gradual; nymphs pass through 5 instars or growth stages in becoming fully winged adults. They molt 4 times. There is no pupa or resting stage in the life cycle. Nymphs look essentially like the adults except for the bright red coloration and the absence of wings.

With each successive molt, the red color diminishes until the adult color, black, is reached. Adults are ⅕ inch long and black with only slight reddish tinges around their legs. Their bodies are somewhat hairy or fuzzy. Adult wings are white (leuco-pterus means "white wing") with a black triangle on the outer margin of the front wing. This is a good point for recognition of the species.

Total maturation takes about 35 days. Egg-laying processes begin 7 to 10 days after the adult stage is reached. Females will lay second generation eggs usually on young corn plants or other grasses which may be succulent at this time.

In the southern portion of the chinch bug's range, there may be three broods of young each year; in other places only two.

There are two forms of the chinch bug *Blissus leucopterus*, a long-winged form, with wings extending over the abdomen, and a short-winged form with fully developed wings which hardly cover the abdomen. Throughout the central United States where the chinch bug is mainly an agricultural pest, the long-winged form predominates.

Blissus leucopterus has a range almost covering the entire United States. It is mainly an agricultural pest in the Mississippi, Missouri and Ohio River valleys, but it causes trouble from the Appalachians to the Rocky mountains. The

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agricultural chinch bug ranges as far north as Quebec and New England and west to British Columbia; south and west to Florida, Texas and Mexico.

Although not generally found in California, Arizona, and Washington, *B. leucopterus* has been collected in those states.

With facts about *Blissus leucopterus* well in hand, we can continue to investigate the other species which are nonagricultural yet economically important and troublesome.

Hairy Chinch Bug

In the northeast sector of the United States, we find another chinch bug. It is called the hairy chinch bug. There is divided opinion whether it is a separate species or only a subspecies of *leucopterus*. Consequently two names are found in the literature describing it: *Blissus hirtus* Montandon and *Blissus leucopterus hirtus* Montd.

Color characters which attempt to distinguish *hirtus* (we shall call it simply *hirtus* because of the doubt as to its status) come from Blatchley's *Heteroptera of North America* (1926): "More robust than typical *leucopterus* with longer and denser and more erect yellowish hairs on the pronotum and sides of the abdomen. The femora are often dark brown (rather than reddish)."

Hirtus is a domestic pest, that is, it attacks lawns and golf courses rather than agricultural crops. Its feeding causes circles of yellowing and death of grasses, mainly bentgrass, in lawns.

Although found predominately in New England, the hairy chinch bug does extend its range west through New York, Pennsylvania, Ohio, and even as far west as Iowa. *Hirtus* has also been taken in Minnesota.

Just as chinch bugs (*leucopterus*) have long- and short-wing forms, long predominating, there are long- and short-wing forms for the hairy chinch bug. Short-wing forms are the most common for *hirtus*.

"At one time," explains Professor J. B. Polivka of the Ohio Agricultural Experiment Station at Wooster, "*hirtus* was considered a distinct species because 50% of the specimens taken were the short-wing forms." This is thought by some to be a criterion for elevating it to species rank.

Short-wing forms are those with smaller, yet mature, wings. These forms do not appear to have large scale migrations from one food plant to another as is commonly observed for the long-wing form.

Lawn Chinch Bug

A third chinch bug exists in the southern parts of the United States. Opinion here is also divided as to whether the lawn chinch bug, as it is commonly called, should be named *Blissus leucopterus insularis* Barber or *Blissus insularis* Barber.

Insularis is described as being shorter and narrower than typical *leucopterus*. The antennae have a relatively shorter terminal segment. The pronotum is a deep velvety black, and has a prominent silvery-gray pubescence (hairiness) on the anterior portion. The overall hairiness (villosity) is shorter and sparser than *leucopterus*.

The wings appear more whitish, and the dark portions of the wings are described as being strongly

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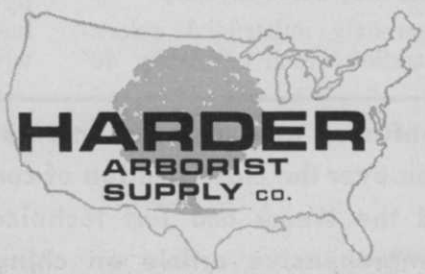

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piceous (pitchy black with a reddish tinge). The femora are frequently castaneous (chestnutty) in color.

The lawn chinch bug is the most damaging species in Florida and in the Gulf region, according to Dr. S. H. Kerr of the University of Florida at Gainesville.

Again as with *hirtus*, the short wing-form of *insularis* predominates. This perhaps gives strength to the argument that it, too, may be a distinct species.

An unknown author refuting the idea that *insularis* is a species has said, "*Insularis* is but a color form of *leucopterus* found in sandy regions. Specimens of typical form from sandy places in Indiana have the front half of the pronotum more silvery-gray than those from nonsandy areas."

The lawn chinch bug is the only major enemy of St. Augustine grass, upon which *insularis* feeds. Many lawns in Florida and Gulf States where St. Augustine is a favorite grass have been laid to waste by lawn chinch bug damage.

In some areas of very dry land where St. Augustine adapts, its cultivation as a lawn grass has been abandoned because of chinch bug ravages.

It appears as though the subspecies or species *hirtus* and *insularis* are the only nonagricultural chinch bugs. *Blissus leucopterus* is not, from our reports, a domestic pest. It is not reported as a pest of home lawns and golf courses.

Professor Harold Gunderson, of Iowa States University at Ames, told *Weeds and Turf* that it is apparently "the abundance of lush pasture grasses, small grains, and corn (in Iowa) which is responsible for the failure of the chinch bug to attack lawns."

Genetics May Solve Mystery

Apparently superficial coloration studies which originally determined species and subspecies are not sufficient to overcome this identity problem. At present, work is being done at the Connecticut Agricultural Experiment Station by David E. Leonard which may determine through genetic breeding trials whether or not *hirtus* and *insularis* are distinct species, or subspecies of *leucopterus*.

The criterion which Leonard uses is the definition of a species, an animal which will reproduce its own kind. Chinch bugs are being bred to see if they will produce fertile offspring. Sometimes interbreeding will produce offspring, but these offspring of two different species are sterile and will not reproduce themselves.

If, for instance, *hirtus* is only a subspecies of *leucopterus*, a mixed pair will successfully breed and the offspring will be able to reproduce. If *hirtus* is separate and distinct, offspring may be produced, but these will be sterile.

To understand this more clearly, consider the fact that the domestic dog is *Canis domesticus*, regardless of the variety on pedigree papers. Domestic dog varieties will interbreed and the offspring can reproduce.

To demonstrate sterile offspring, we look to the cross between a horse and an ass, two different species. The offspring in this case, a mule, has characters of each parent species, but will not reproduce mules because mules are sterile.

The status of chinch bugs awaits results of these tests at Connecticut.

Damage

Chinch bug damage, whether in the Northeast or South, will be similar except for the species of grasses attacked.

When chinch bugs hatch, the nymphs begin feeding around the bases of the grasses on which eggs were laid. Their feeding causes the grass blades to become yellow because water is being withheld from the leaves above.

The grass dies and turns brown and the nymphs move to adjacent plants away from the central dead area. Their outward movement causes large dead circles in lawns unless measures are taken to stop them. Sometimes infestations are blamed on grass diseases and other disorders, because the nymphs are so small they may not be noticed right away.

An easy test to detect the presence of chinch bugs uses a large tin can which has both ends removed. Push one end about half way into the grass around edge of an area of suspected infestation. Fill the can with water and wait five minutes.

Young chinch bugs, if they are there, will soon float to the top of the water. Positive identification can then be made.

Hemiptera possess odor organs which cause vile smells when the bugs are crushed. An experienced contract applicator can detect infestations by simply walking across lawns and keeping his nose alert for the odor.

Although the hairy chinch bug may be found on many kinds of grass, the most probable, and the one which receives the most damage, is bentgrass.

The lawn chinch bug is found usually on St. Augustine grass, but has been recorded feeding on other grasses such as Bermuda and centipede. St. Augustine can grow on dry sandy areas where chinch bug development is favored and the grass resistance is lowered.

Biological Control

Greatest chinch bug infestations occur during hot dry spells. More humid weather fosters development of a white fungus called *Beauveria globulifera* which decimates populations during damp conditions. This fungus occurs naturally and is not commercially produced as is the milky disease fungus which controls the Japanese beetle.

A small wasp described as a "speck in one's hand" has been credited with parasitizing 30 to 50% of chinch bug eggs in a single area which was tested. This wasp

Confusion among some entomologists and lawn spraymen over the classification of certain chinch bug variants led the *Weeds and Turf* technical staff to prepare this comprehensive article on chinch bug control. Several agricultural experiment stations cooperated in the compilation of this research data.

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is called *Eumicrosoma benefica* Gahan.

Other natural enemies of chinch bugs are the red-winged blackbird, bobwhite, catbird, brown thrasher, and meadowlark. Bird predation, however, is not dependable as a means of biological control because birds do not eat enough of the bugs to be classed as a major control factor.

Chemical Control

Chemicals recommended vary from old standbys to the newest weapons needed to combat resistance which shows up in some populations.

DDT, used on *insularis* in tests conducted at Auburn, Alabama, by Eden and Self in 1960, at 10 lbs. active (equals technical) in either spray or granular form, protected the grass for 4 months. DDT has also given control of *hirtus* in Ohio.

Chlordane can be used at 1¼ lbs. active material per 5000 sq. ft. against *hirtus* in some parts of New England.

Unlike chlordane and dieldrin, which are available as emulsifiable concentrates, powders, and dusts, diazinon has been used on lawns as an emulsifiable concentrate and wettable powder.

Recently Geigy developed a granular diazinon called Spectracide 2 G, which is available this year, for use against lawn insects, especially chinch bugs. It will be applied at the same rate as mentioned below for diazinon.

Diazinon at 7½ ounces active per 5000 sq. ft.; dieldrin at ⅓ lb. active per 5000 sq. ft.; and Sevin at 1 lb. active per 5000 sq. ft. are also recommended against *hirtus* in the Northeast. These chemicals are used in the South also.

Florida, having applied chemicals against chinch bugs for a longer period of time and developed more resistance in them, recommends newer insecticides for use against this most serious lawn pest.

V-C 13 is recommended at a maximum of 3 lbs. active per 5000 sq. ft. Trithion is used at 12 ounces active per 5000 sq. ft., and Ethion is advised at 1 lb. active per 5000 sq. ft. These chemicals are also used in states other than Florida.

Newest addition to the Florida recommendations is Aspon, which will be used at about 12 oz. active per 5,000 sq. ft. This is marketed by Stauffer.

Regarding the use of parathion, Dr. S. H. Kerr told *Weeds and Turf*, "At one time it [parathion] was about the only effective material spraymen had in some places, but now there are so many other effective materials available that are far less toxic to warm-blooded animals, we feel there is little justification for continuing its use."

Oddly enough, Zytron, Dow's new pre-emergence herbicide for crabgrass control, appeared useful in experimental trials both in Florida and Alabama. It is not yet registered for use against chinch bugs, however.

It should be mentioned that turf fertilization, specifically application of nitrogen, fosters chinch bug development and increases chances that there will be damage.

Often nitrogen is applied when grasses normally slow their growth. The purpose of the nitrogen is to boost growth. This excess nitrogen may work to the disadvantage of the lawn if chinch bugs develop to infestation levels. Moderate fertilization, if any, is advised; keep the nitrogen at a minimum during chinch bug seasons.

Application Techniques

Tests from Ohio Experiment Station conducted by Professor Polivka showed that a second treatment of insecticide is necessary to combat the second generation which may be in the egg stage when the first treatment is applied.

First treatment may be made when damage becomes very evident. If the first treatment is made to prevent early injury, Professor Polivka advises, the second treatment should be applied in August.

In areas where chinch bug damage was evident the previous year, it is advisable to apply control materials early in the season, preferably late May or early June, to control the developing first generation.

If a spray is to be applied, it is wise to water the lawn thoroughly before treatment so that the water carrier used for treatment will penetrate better. After treatment, do not water for several days.

If prewatering is not done, up to 30 gallons of water per 1000 sq. ft. may be desired for proper penetration. Nozzles which produce coarse sprays are generally preferred to reduce drift and aid penetration.

If dusts or granules are applied, the lawn should be watered thoroughly a day or so before, so that the soil will be sufficiently supplied with water. It should be allowed to dry out on top, because dry chemicals applied to wet grass may cause a discoloration.

After application of dry material with a calibrated spreader or dependable broadcaster, the lawn should be sprinkled lightly to wash the chemical down around the crown of the grasses where the insects feed. Dry applications should be left unwatered also for several days afterward.

Strive for even distribution of the chemical regardless of the form used. Be certain to read all of the label directions and precautions before application.

Resistance of an insect to a chemical insecticide may crop up where that chemical is used sufficiently to cause selection pressure on the population. A few insects may escape elimination and reproduce, passing on to their offspring the ability to tolerate chemical treatment. The offspring too are "weeded" for the ones not fit to survive in an insecticidal environment, and those left build up populations of resistant insects quickly because they have a high rate of reproduction.

Such has been the case in Florida. DDT had been used in the past to control chinch bugs and other lawn insects. Chinch bugs are now, according to Dr. S. H. Kerr, "evidently resistant to DDT in much of Florida."

In Connecticut, David E. Leonard reports, "spraying occurs only when chinch bugs are a problem, but *hirtus* has become resistant in some places. This has occurred because chinch bugs were exposed to chemicals used for control of grubs and other lawn insects long enough to have developed resistance."

Professor Milton G. Savos told *Weeds and Turf* that resistance to dieldrin, DDT and chlordane was

(*Continued on page W-25*)

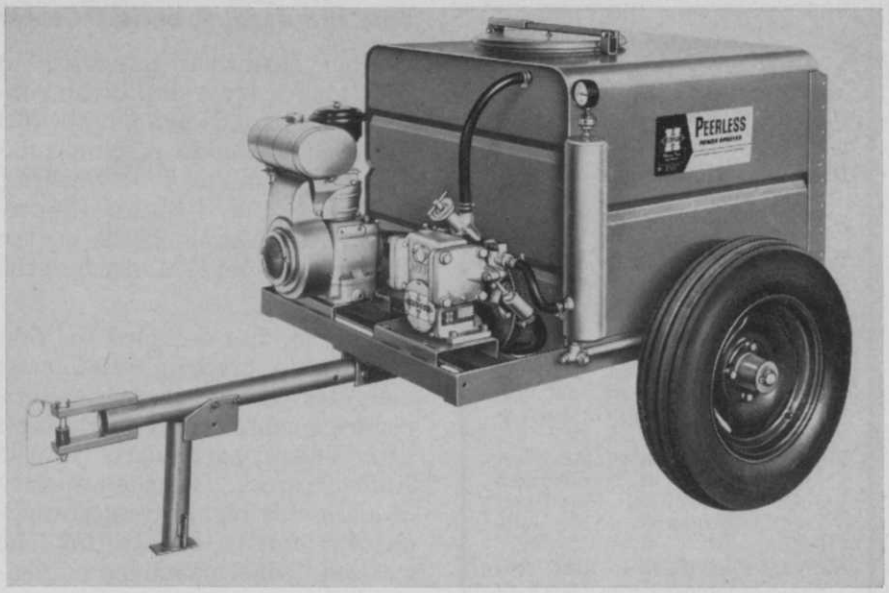
Hudson Adds Nonlubricating Pump to "Peerless" Sprayers

Drive mechanism of the new "Ten-O-Matic" pump, from H. D. Hudson Manufacturing Co., is enclosed in a transmission chamber which runs in a bath of oil, the firm announces.

New pump thus operates without the use of packings, cups, sliding pistons, or similar wearing parts, and eliminates the need for daily lubrication, Hudson reports. All "Peerless" power sprayers of 10 gpm output will include the "Ten-O-Matic" as standard equipment, a company spokesman revealed.

After a 10 hour break-in period, oil in the transmission is changed only once every 100 hours, or once a season, whichever comes first. All parts of the pump with which chemicals come into contact are made of metals and synthetics of extremely high corrosion resistance, the firm adds.

New pump will maintain constant volume up to 10 gallons per minute at pressures up to 400 lbs. without noticeable dropoff from slippage or leakage, Hudson claims.



Packings, cups, sliding pistons, and similar wearing parts are eliminated in the new "Ten-O-Matic" pump, from H. D. Hudson Manufacturing Co., which has a transmission chamber that runs in a bath of oil, the manufacturer claims.

Sprayers with the new "Ten-O-Matic" pump come in 150-, 200-, and 300-gallon sizes, Hudson reports, and are available on skids for use on a truck or trailer, on wheels with a hitch for truck or tractor drawbar, and with front-end casters and hitch for tractor or truck towbar.

For more information on the new pump, write H. D. Hudson Manufacturing Co., 589 East Illinois St., Chicago 11, Ill.

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Meeting Dates

International Shade Tree Conference, Western Chapter, Annual Convention, Star Dust Hotel, Las Vegas, Nev., May 12-15.

Florida Nurserymen & Growers Assn. Annual Convention, Deauville Hotel, Miami Beach, Fla., May 23-25.

South Carolina Nurserymen's Assn. Annual Convention, Clemson House, Clemson Agricultural College, Clemson, S.C., June 9-11.

Plains Nurserymen's Assn./New Mexico Assn. of Nurserymen Joint Convention, Cloudcroft Lodge, Cloudcroft, N.M., June 9-11.

National Plant Food Institute Annual Conference, Greenbrier Hotel, White Sulphur Springs, W. Va., June 9-12.

3rd Annual Meeting, Fla. Society of Golf Course Superintendents, Jacksonville, June 18-20.

American Society of Landscape Architects Annual Meeting, Penn-Sheraton Hotel, Pittsburgh, Pa., June 23-26.

USDA Field Day for industrial cooperators. Plant Industry Station, Beltsville, Md., July 10.

American Assn. of Nurserymen Annual Convention, Shamrock Hilton Hotel, Texas, July 20-24.

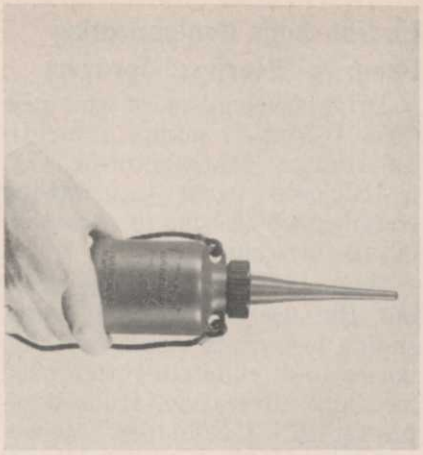
Tree Wardens, Arborists Confer

More than 300 specialists in park maintenance and brush control examined practices and surveyed up-to-date recommendations at the annual Tree Wardens, Arborists, and Utilities Conference, held March 18-22 at the University of Massachusetts, Amherst.

Pesticide use occupied the first afternoon's program, and most delegates agreed that the anti-pesticide campaigners would have little effect, particularly in the Amherst area. "But the necessity of using only highly trained applicators must constantly be stressed," one attendant emphasized.

Continued cooperation and understanding among telephone and electric companies and municipalities was also covered; municipal tree planting should be functional and esthetically pleasing, but must provide for utmost disease control, the delegates concluded.

Annual conference is sponsored by the Massachusetts Tree Wardens' and Foresters' Association, in cooperation with the Electric Council of New England, Massachusetts Arborists Association, New England Telephone & Telegraph Co., and the College of Agriculture at the University of Massachusetts.



New paint pot, manufactured by the Harder Arborist Supply Co., is made of heavy-duty plastic, and is claimed to be leak-proof and virtually indestructible. Pot comes with a replaceable dauber, and has a handle that fits on a pole saw, or clips on saddles or scabbards, Harder reports. For more information on the paint pot, write Harder Arborist Supply Co., 63 Jerusalem Ave., Hempstead, N.Y.

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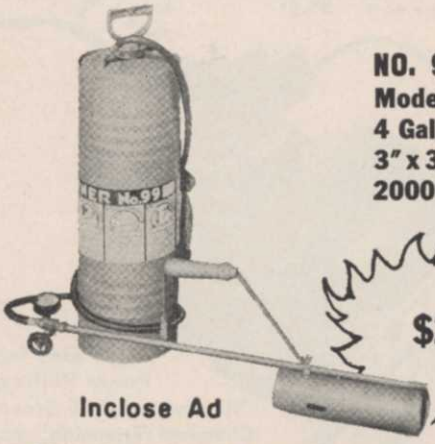

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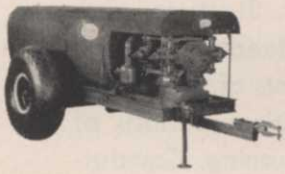

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Chinch Bugs

(*from page W-22*)

found in 1960 in Fairfield County (SW Connecticut), and in 1961 in New Haven County (S. Central Conn.).

Localized resistance in Florida to parathion, a highly toxic material, has been found "about residential neighborhoods right on the ocean front, bays, salt water waterways and canals in the southern third of Florida," according to Dr. Kerr.

Although resistance may thwart efforts of CAs in one area, other places are relatively free of resistance and control may be achieved with DDT as has been shown by tests in Ohio and Alabama.

County agents and extension services should be consulted where there is doubt about the ability of insects in an area to resist a particular chemical treatment.

In view of the confusion surrounding the use of the term "chinch bug" for three different insects, we suggest that the adjectives be added to the common names. Hairy chinch bug is the northeastern form; lawn chinch bug is the southern form; and chinch bug remains the pest of wheat and corn. Regardless of the uncertainty of scientific nomenclature, it is helpful to mention one of the scientific names when relating facts about any of the insects concerned.

Western Weed Conclave Views Turf Maintenance March 20-22

Increased interest in turf management in the western states was demonstrated by all-time high attendance of more than 230 contract applicators and other professionals at the Western Weed Control Conference, held this year in Portland, Ore., March 20-22.

Representatives of academic, extension, regulatory, and commercial fields heard a wide variety of papers, highlighted by a symposium on the deposit and entry of sprayed herbicides into foliage.

Herbert M. Hull, of the Agricultural Research Service, U.S. Department of Agriculture, Tucson, Ariz., was chairman of the research section of this year's program.

L. L. Jansen, from the Crops Research Division, Agricultural Research Service, USDA, Beltsville, Md., traveled to the Portland meeting to analyze surfactant enhancement of herbicide entry, while T. J. Muzik, Washington State University, Pullman, reported on experiments on the effect of light and temperature on response of plants to 2,4-D.

Application techniques for improving deposits and minimizing drift, plant surfaces and herbicide penetration, and physiology of herbicide trasport in plants were covered by C. R. Kaupke, C. L. Foy, and A. S. Crafts all from the University of California, Davis.

At the conclusion of the conference, a number of delegates attended a tour of the Oregon State University campus and turf research facilities.

Officers elected for the 1965 Conference included J. M. Hodgson, president; Millard Swingle, vice president; and Louis Jensen, secretary. Albuquerque, New Mexico, will be site of the 1965 Conference, *W&T* learned.

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CRAB-E-RAD 30 (Liquid) DSMA

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Hitting on a wide range of turf problems at the annual Turf Conference, University of Massachusetts, March 7-8, extension agents from that state who addressed the delegates included (left to right): William J. Bennett, Lewis A. Hodgkinson, H. Thurston Handley, Jr., Herbert C. Fordham, and Dominic A. Marini.

Estimate '63 Lawn Pest Infestations At Annual U. of Mass. Turf Conference

Continued Japanese beetle infestation, widespread chinch bug and frit fly injury, and more leaf hoppers — these will be the effects of 1962 weather on this year's incidence of insects on golf turf and home lawns — at least in the New England area.

Speaking at the Annual Turf Conference at the University of Massachusetts, March 7-8, Professor John C. Schread of the Connecticut Agricultural Experiment Station at New Haven, told the more than 500 participants that other factors enter into the picture of forecasting insect abundance.

These include parasites, predators, nematodes, bacteria, protozoa and predatory animals.

"Fertilizing from spring to late summer is necessary. A 'non-burning' type high in nitrogen is best for home gardens. A well-fertilized lawn reduces the requirement for water," said County Extension Agent Lewis Hodgkinson in his talk on maintenance and equipment.

Among top turf men from Massachusetts at the Turf Conference were Eliot F. Rogers (left), president of the Massachusetts Turf Council, and J. Richard Beattie, cooperative extension associate director.

Rolling can be harmful or helpful, but best done in the spring on shallow-rooted lawns such as new lawns or lawns with little topsoil, he added.

"There's no short-cut or cheap way out in establishing a good lawn," declared Prof. Herbert C. Fordham, Massachusetts Extension horticulturist in discussing lawn construction and insect problems. "Drainage, quality of topsoil, insect control and proper watering are the 'plusses' that must go into a good lawn."

"Which Fertilizer to Use?"

William Bennett, regional extension agent in horticulture, told delegates that type of fertilizer to use is a frequent problem facing CAs. "What to use? How much? When?" he asked.

Balance in fertilizing is fundamental for a healthier and denser turf. Each fertilizer is good if used according to its characteristics and within limitations, he continued. Different types of fertilizer include the inorganic sources such as commercial fertilizers, 10-10-10, 5-10-5, etc.; natural organic fertilizers typified by sewage sludge, bean meals; synthetic organic sources such as urea-formaldehyde; and finally, a combination of organic and inorganic such as 10-6-4, 1-5-5 and 8-6-4, Bennett enumerated.

A combination of organic and inorganic sources of fertilizer probably is best for home lawns in general. "Based on 3 lbs. of nitrogen per thousand square feet per year, applied at rate of 1 lb. of nitrogen per application, best times to fertilize would be about April 1, May 15, and September 1," Bennett concluded.

Confusion and ignorance regarding lawn products such as fertilizers, seed, weedkillers, and management practices are the main problems today, Dominic Marini, county extension agent, emphasized in a discussion of weeds and diseases.

In the Cape Cod area, heavy fog and high humidity are conducive to diseases, especially on heavy turf, he noted. Alternating three fungicides at 2 or 3 week intervals usually gives good control. Crabgrass, toadstools, grubs, and beetles are prime offenders in the pest field.

Role of urea-formaldehyde fertilizers (methylene ureas) was discussed by two separate speakers, H. Thurston Handley, Jr., and Herbert C. Fordham. Both extension horticulturists arrived at the same conclusion: ureaform is an excellent nitrogen product that can be applied twice a year to dry turf to supply nitrogen for a growing season without fear of burning. Part of the nitrogen will break down rapidly for quick results and the remainder gradually for long-term feeding of turf.

Labor-management relations, golf course maintenance and problems, land usage, and plantings were other topics covered during the two-day conference.

Chlordane Controls Billbugs

Chlordane, applied at a rate of 2.5 lbs. of actual material per acre, has been found an effective control of merion bluegrass billbugs, scientists at the Ohio Experiment Station, Wooster, report.

Merion bluegrass, a relatively new variety of lawn grass, has been tested in nitrogen fertilization plots at the Station when brown spots were first noticed. Inspection showed the crowns of the plants destroyed by larvae of the bluegrass billbug, an uncommon pest in Ohio.

Dieldrin and heptachlor, when applied at 3 lbs. per acre, were also effective control measures for the billbugs, the turfmen reported.

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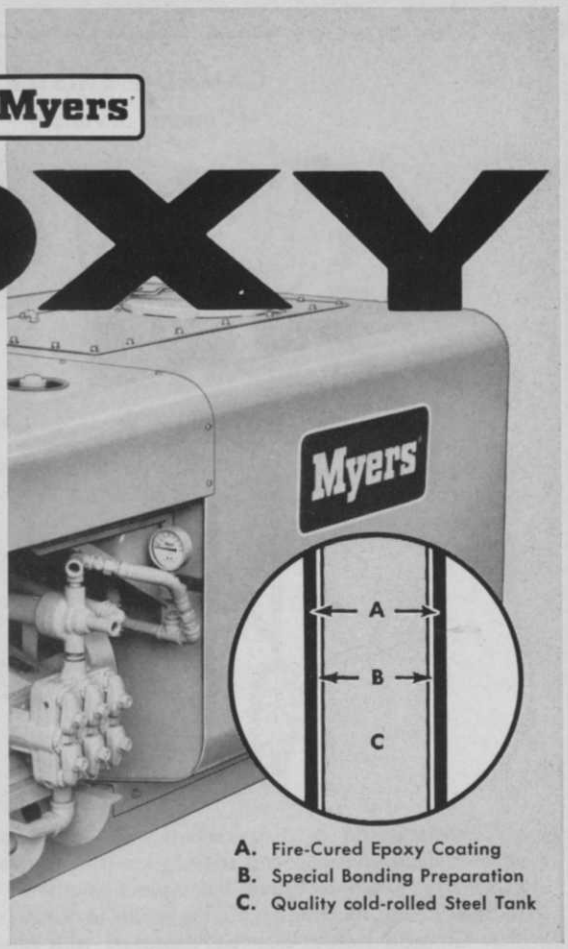

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Know Your Species

CANADA THISTLE

(Cirsium arvense)

Canada thistle is a perennial which reproduces by seed and by sprouts from underground rootstocks. This aggressive and difficult-to-eradicate weed is found throughout southern Canada and northern United States. Its range extends south to Virginia and west to Calif.

A Canada thistle may be confused with other thistles such as bull thistle, *Cirsium vulgare*, or tall thistle, C. *altissimum*. A characteristic which will separate them is the size of the flower head. A Canada thistle head is less than ¾ inch in diameter (usually about the size of the tip of a pointed finger). Heads of most other thistles are much larger. Also, tall thistle has no hair on its stem; bull and Canada thistles do. Canada thistle has a lavender flower, while bull thistle has a darker purple flower. Since Canada thistle arises from creeping roots, erect stems are often found crowded in twos and threes, whereas the other two species have single stems with taproots.

Stems of Canada thistle are erect, grooved, and branched only on top (A). Leaves have scalloped, prickly edges typical of thistles.

Flower heads of Canada thistle are more numerous than on many other species. Each flower is less than ¾ inch in diameter and not spiny. Canada thistle is dioecious ("two houses"), which means that male and female flowers are borne on separate plants. Flowers on staminate or male plants are oblong, whereas those on seed-bearing plants are more ovoid, lengthening somewhat at maturity.

Seeds (B) are 3/16 inch long with a circular rib at one end to which is attached the tannish feathery down (C) which carries the seed on the wind.

Creeping stems and roots send up new plants intermittently (D, E). Roots may be several feet deep and are connected horizontally (F). It is this root growth pattern which makes Canada thistle so difficult to eradicate.

Where soil sterilization is not desired, 2,4-D in the amine form (because it kills tops slowly and permits herbicide movement to roots), or MCPA are useful control chemicals if applied to actively growing plants in the late vegetative to early bud stages of growth.

Soil-applied herbicides, such as sodium chlorate or chlorate-borate-monuron combinations and 2,3,6-TBA, will control Canada thistle. Repeated treatments of amino triazole as a translocated herbicide will also kill this troublesome weed.

Prepared in cooperation with Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.

(DRAWINGS FROM NORTH CENTRAL REGIONAL PUBLICATION NO. 36, USDA EXTENSION SERVICE)

Stauffer Has New Insecticide, Aspon, for Chinch Bugs

Aspon, a new insecticide from Stauffer Chemical Co., is reported to be a highly effective lawn chinch bug control.

Initial kill in test areas has been 95% or better within 48 hours, according to Stauffer, and control frequently lasts 60-90 days or more. Moreover, the firm continues, even chinch bugs highly resistant to other insecticides, such as DDT, are controlled with Aspon.

Aspon, chemically tetra-n-propyldithionopyrophosphate, is applied to lawns in water dilution, and will not have any harmful effect on turf grass, although it is slightly toxic to mammals, Stauffer points out.

After being tested in Florida for two years, Aspon is now on that state's recommemded list for lawn chinch bug control.

For more information on the new insecticide, write to Stauffer Chemical Co., 380 Madison Ave., New York 17, N.Y.

Control Scales with Oil Spray

Scale insects should be controlled before they have an opportunity to attack ornamentals, and shade trees, according to William Hantsbarger, extension entomologist at Colorado State University.

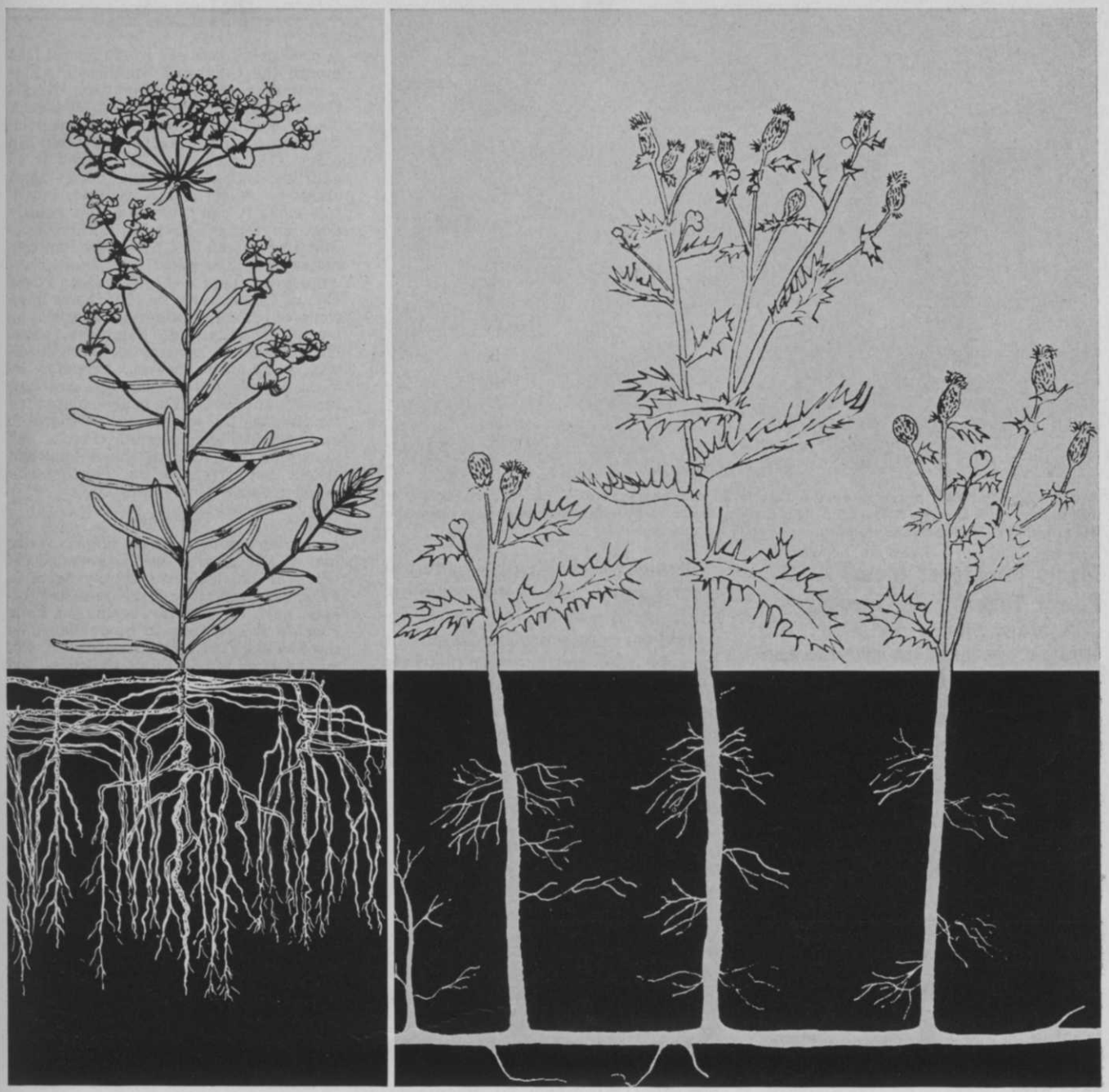
"Apply a dormant spray before the trees break into buds," Hantsbarger recommends, using about a 4% solution. All parts of the tree must be completely covered to be effective, he added.

Chemagro Reports on Dyrene

Results of tests on Dyrene, a turf fungicide from Chemagro Corp., developed for dollar and leaf spot, melting out and rust, are available in a new booklet published by that firm.

Bound into an 8-page brochure, the reports show how grounds superintendents in New York, Massachusetts, and Michigan successfully used Dyrene; application rates and schedules are discussed as well.

Copies are available by writing to Chemagro Corp., P.O. Box 4913, Kansas City, Mo., and asking for bulletin DY6-163.



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For over 35 years, it's been dependably destroying such pests as Canada thistle, leafy spurge, bindweed, Johnson grass and Russian knapweed.

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Technical aid. Our full-time agronomists can help you with weed-control plans and advise on handling, storing, and using sodium chlorate.

For descriptive folder, or name of the Hooker distributor nearest you, please write Hooker Chemical Corporation, 405 Buffalo Avenue, Niagara Falls, N. Y. *Sales Offices:* Boston, Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelpha, Tacoma. *In Canada:* Hooker Chemicals Limited, North Vancouver, B. C.

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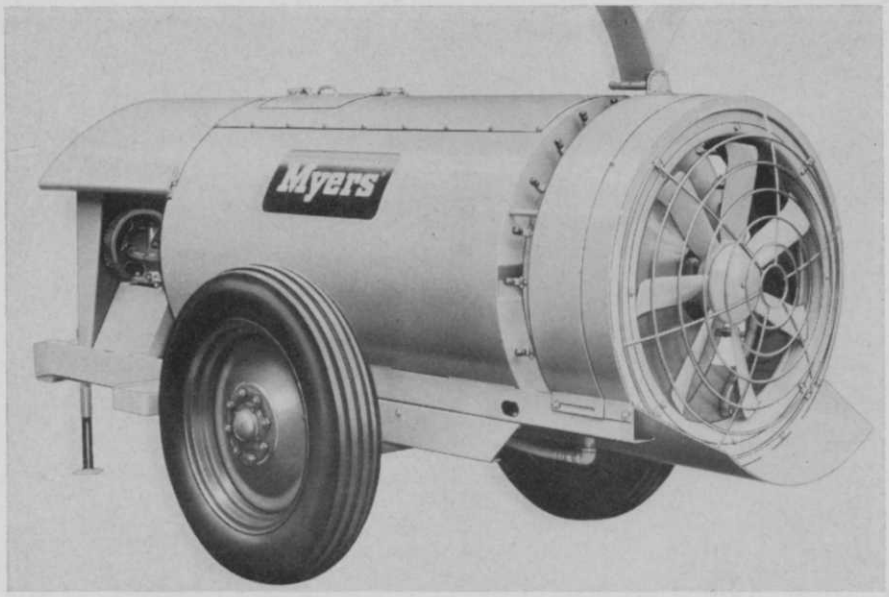

A hinged hood panel provides easy access to the new power take-off air sprayer recently introduced by the F. E. Myers & Bro. Co., Ashland, Ohio. Round spray tank is designed with a removable top to facilitate inspection and cleaning.

Myers Introduces Model A-32 Power Take-Off Air Sprayer

A new, power take-off air sprayer, designed to provide fast and economical production in a wide variety of spray applications, has been introduced by the F. E. Myers & Bro. Co., Ashland, Ohio.

Called the A-32, the new model is available in either 300- or 400-gallon tank sizes, and comes equipped with Myers 6125 spray pump, said to operate at pressures up to 800 lbs.

Straight-through drive shaft is incorporated, and power take-off shaft is the ball-spline type, designed for minimum thrust on the sprayer and the tractor bearings while the shaft is turning, a company spokesman reveals. Spray tank, as well as all blower parts on the new A-32, are protected against corrosion by Myers' epoxy coating, the firm reports.

For more information on the new sprayer, write the company in Ashland, Ohio.

Ansul Chemical Co. Introduces New Post-Emergent Herbicides

Two new post-emergent herbicides from Ansul Chemical Co. have recently been marketed by that firm.

Ansar 157 monoammonium methanearsonate, which has been tested under two separate formulations, A-12 and A-12-M, is claimed effective in controlling crabgrass, dallis grass, and nut grass in established turf. Recommended treatment is 1½ to 2 lbs. per acre.

Bermuda, blue grass, dichondra, and zoysia grasses are tolerant, while St. Augustine and centipede are susceptible to this compound, according to Ansul.

Ansar 184 is a technical grade product containing the equivalent of 100% disodium methylarsonate hexahydrate, the company reports.

Herbicidal activity on grassy weeds and relative safety from a toxicity point of view are two of its outstanding characteristics, Ansul spokesmen claim.

Ansar 184 acts primarily as a foliage-absorbed agent, and the observed symptom of herbicidal activity is a gradual chlorosis of the leaves 2 to 4 days after application, the firm reveals.

Brochures are available on both herbicides. Interested CAs may write the firm, at Marinette, Wis., for a free copy of the pamphlet on Ansar 157 or on Ansar 184.

Tobacco Fumigating Covered

Correct techniques to fumigate tobacco seed beds are detailed in a new pamphlet published by the Great Lakes Chemical Corp. Importance of properly preparing and fumigating seed bed soil are stressed in the folder, available by writing the firm at 206 South St., West Lafayette, Ind.

Trimmings

O good grief, here she comes again! Last month the Columbia Broadcasting System put another spotlight on Rachel Carson and her antipesticide obsessions. The hour-long program, which was relatively fair in its presentation, surely had many CAs groaning "When will it all end?" *Silent Spring* has been talked about as much as the weather, but in this case, it can't be said that nobody does anything about it. Witness a recent issue of an electric utility company house organ. The paper, *West Penn News*, employee paper for the West Penn Power Co., of Greensburg, Pa., lists some questions which employees may be asked, by fearful if unknowing neighbors, about chemical brush control along rights-of-way. And the answers, prepared by West Penn's Fred Ashbaugh, are fast, factual, and facile. We congratulate Fred for pointing the way for his personnel to answer outsiders queries. (Fred's well known in the industry as a long and ardent supporter of the Northeastern Weed Control Conference.)

* * *

Long day's journey into blight. **We've just heard about Florida nematologist Gil Whitton, assistant county agent in Pinellas County, and the gruelling 12-hour days he puts in working on *Your Florida Lawn*, soon to be published by the Florida Turf Grass Association. Gil, an expert on top dressing, thatching, and verticutting, wheels through this formidable schedule apparently fortified by his ever-present black cigar, and bottomless cup of black coffee. These Florida scientists just aren't prone to lie in the sun, it seems to us, when there's turf blight to be eliminated!**

* * *

Under (and over) his thumb. We just had a nice letter from D. Parker-Sproule (part of which appears in the *Letters* column on page W-6) who runs Thumb Weed Spraying Service in Harbor Beach, Mich. Mr. Parker-Sproule is of Canadian origin, and has a most varied background in weed and general pest control. For example, he once took an expansion-minded pest control firm in Toronto, which had nine branches, and turned it into a bonafide weed control company, which later received contracts ranging from military camps to private estates to entire cities! The versatile Canadian also operated in Sarnia, Ont., where he guided what he calls modestly and simply "a large operation." This "operation" was apparently a major one, because the firm added industrial plant site weed control contracts to its books, along with lawn spraying jobs, and again, contracts for weed and turf work for complete cities. What made Mr. Parker-Sproule forsake all this for Michigan's Thumb? You guessed it! "I was finally sold on coming to the state of Michigan to join my wife," he writes candidly.

* * *

Our busy suppliers. **Just learned that Geigy's George R. Ferguson (he's president of the herbicide/insecticide firm) addressed a Rutgers University gathering recently about the need for more technically trained, research-oriented scientists for industry. Most CAs, whose expanding businesses keep them constantly on the go, will probably agree that this industry, in particular, has lucrative, challenging positions for young chemists, botanists, and horticulturists.**

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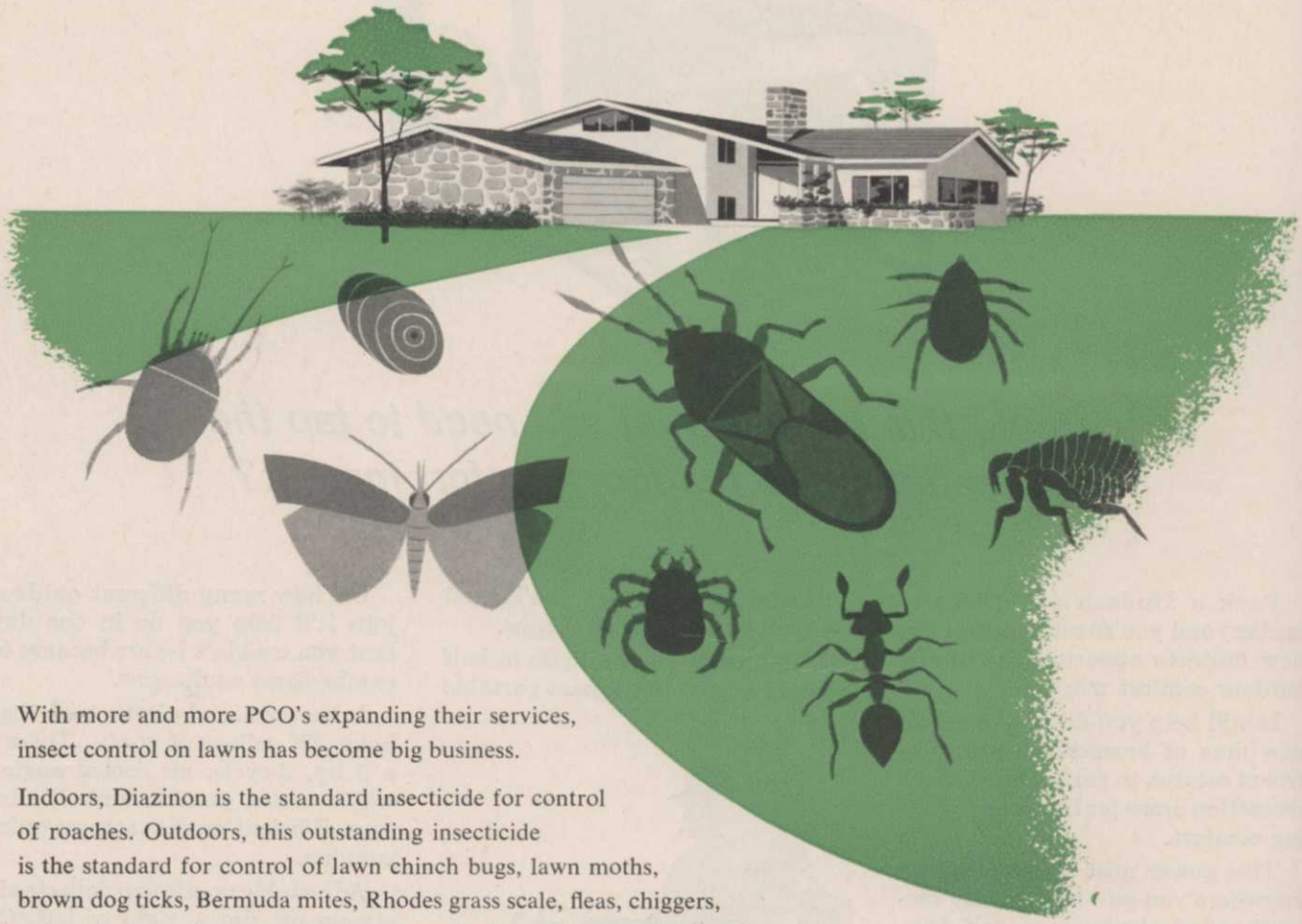

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